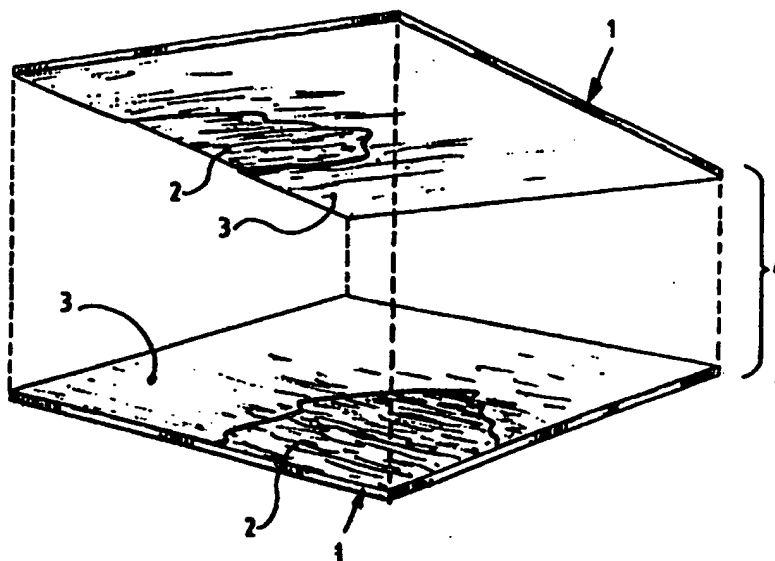


**PCT**WORLD INTELLECTUAL PROPERTY  
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER

WO 9607785A1

(51) International Patent Classification <sup>6</sup> : <b>D06N 7/00</b>		A1	(11) International Publication Number: <b>WO 96/07785</b>
			(43) International Publication Date: 14 March 1996 (14.03.96)
(21) International Application Number: PCT/NL95/00297			(81) Designated States: AU, CA, JP, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).
(22) International Filing Date: 4 September 1995 (04.09.95)			
(30) Priority Data: 9401436 2 September 1994 (02.09.94) NL			
(71) Applicant (for all designated States except US): NYGAARD WITVOET & PARTNERS (NL/NL); Laan van Vollenhove 8, NL-3706 AA Zeist (NL).			
(72) Inventors; and (75) Inventors/Applicants (for US only): NYGAARD, Mogens, Ovesen (DK/NL); Langenhorst 12, NL-6714 LS Ede (NL). WITVOET, Hendrik (NL/NL); Denneweg 19b, NL-3735 MP Bosch en Duin (NL).			
(74) Agent: BARTELD, Erik; Arnold & Siedsma, Sweelinckplein 1, NL-2517 GK The Hague (NL).			

**Published***With international search report.  
In English translation (filed in Dutch).***(54) Title: METHOD FOR MANUFACTURING CARPET TILES AND CARPET TILE THUS MANUFACTURED****(57) Abstract**

The invention relates to a method for manufacturing carpet tiles wherein each carpet tile is provided on its backing with an anti-slip layer extending over practically the whole tile and comprising an adhesive. After applying of the anti-slip layer the tiles can be adhered releasably to each other and then packed. The invention further relates to a carpet tile having on its backing an anti-slip layer as manufactured by this method. The anti-slip layer can comprise an adhesive which is chosen such that the adhesive power between the anti-slip layer and the backing of the tile is greater than between the anti-slip layer and a surface for covering with the tile. Finally, the invention also relates to a packaging filled with at least two such carpet tiles.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

**METHOD FOR MANUFACTURING CARPET TILES AND CARPET TILE  
THUS MANUFACTURED**

The invention relates to a method for manufacturing carpet tiles, to carpet tiles manufactured with this method and to a packaging filled therewith. The invention relates more particularly to a method for manufacturing carpet tiles by providing each carpet tile on its backing side with an anti-slip layer comprising an adhesive. Such a method is known from EP-A-0 194 876.

Carpet tiles are generally known and are increasingly used as floor covering since in a great number of applications they offer great advantages compared with so-called broadloom carpet supplied on a roller. For instance, carpet tiles can be taken up easily to obtain access to spaces under a floor, e.g. a system floor, in order to lay or reposition electricity cables, computer cables and the like. Carpet tiles can moreover be removed locally in a room area without it being necessary to cease activities completely in this area, as would be the case with broadloom carpet. This is of particular importance for use in work areas. Also when carpet tiles are used, small portions of a floor covering can be replaced, which is important when the wear of the carpet is considerably greater at some locations than at others, for instance in parts of an office space walked on intensively or under desks. Replacement of carpet can thus take place in phases, depending on the intensity of use thereof. In addition, carpet tiles are lighter, easier to handle and simpler to transport than rolls of carpet, which is important in the case of use in high buildings. Finally, carpet tiles are simpler for DIY enthusiasts to work with.

A drawback of carpet tiles is that they tend to shift more quickly than a broadloom carpet fixed at its edges. There is moreover the danger with carpet tiles that when the floor is being cleaned using a powerful

vacuum cleaner they are unintentionally picked up due to the suction force. This problem occurs particularly in the case of the light-weight carpet tiles which have become popular in recent years. In order to obviate this drawback it has already been proposed to glue carpet tiles fixedly to the ground. However, a large part of the above stated advantages of carpet tiles, in particular the option of being able to take them up easily, is hereby lost. The arranging of carpet tiles also becomes relatively labour-intensive and therefore costly in this way.

It has also been proposed to adhere carpet tiles to the ground by means of a releasable adhesive layer, the adhesive power of which parallel to the ground is sufficient to prevent shifting of the carpet tile, while the adhesive power transversely of the ground is so small that the carpet tile can be released again with relatively little effort. Such an adhesive is made commercially available by for instance the Unipro company of Haaksbergen under the name "UZIN U 1000 L". This known solution has the drawback however that applying of the adhesive to the ground must take place carefully and that after application the adhesive must be dried for a period of time (about 10 to 15 minutes depending on the prevailing temperature and air humidity), since too rapid a drying would entail the danger of a permanent join still resulting between the carpet tiles and the ground. The laying of the carpet tiles thus still becomes a time-consuming and costly operation.

In order to resolve the above stated problems a method for manufacturing carpet tiles is proposed in the said patent specification EP-A-0 194 876 wherein each carpet tile is provided on its backing side with an anti-slip layer comprising an adhesive. This anti-slip layer herein takes the form of a plurality of anti-slip blocks arranged in a specific pattern on the back of the tile. This pattern is so chosen herein that two carpet tiles can be placed with their backing against each other

without the adhesive anti-slip layers coming into mutual contact. As additional precaution, those portions of the backings where no anti-slip blocks are situated can be treated with a substance repelling the adhesive. By

5 applying the anti-slip layer to the carpet tile instead of on the ground and by already doing this during manufacture of the carpet tiles, laying of the carpet tiles is greatly simplified, while a good anti-slip of the carpet consisting of such tiles is still obtained. It is  
10 moreover thus possible to suffice with a smaller amount of adhesive which, together with the tile, is ultimately burned or made suitable for re-use, thus minimizing the environmental impact.

The known method has the drawback however that  
15 as a result of arranging the anti-slip layer in the form of separate blocks or "patches" of adhesive, the carpet tile has differing thicknesses locally, whereby the comfort and the appearance of a floor covering formed by such tiles are adversely affected. In addition, the  
20 applying of an anti-slip layer to the tiles in a particular pattern is relatively laborious. Packing of the tiles such that the adhesive blocks remain free of each other is also complicated.

The invention therefore has for its object to  
25 provide a method of the above described type wherein these problems do not occur. This is achieved according to the invention in that the backing of the carpet tile is covered practically wholly with the anti-slip layer. Applying of the adhesive anti-slip layer uniformly over  
30 the whole surface of the carpet tile results in a tile of constant thickness with which a more comfortable and visibly flatter floor covering can be formed.

After applying of the anti-slip layer the tiles are preferably adhered releasably to each other and  
35 subsequently packed, wherein the tiles are more preferably adhered to each other in pairs with their backing side. Surprisingly, it has been found here that even when two adhesive layers are placed in mutual

contact over the whole surface of the tiles, the tiles are still easily releasable again later. The tiles can thus be transported in efficient manner, wherein moreover a minimum of packaging material is required.

5           The invention also relates to a carpet tile manufactured according to the above described method. In a preferred embodiment of the invention the adhesive of the anti-slip layer of the carpet tile is chosen such that the adhesive power between the anti-slip layer and  
10 the backing of the tile is greater than between the anti-slip layer and a surface for covering with the tile. Thus is ensured that, also after taking up, the anti-slip layer remains joined to the tile and does not remain behind on the ground. In a further preferred embodiment  
15 of the invention the adhesive is chosen such that the adhesive power between the anti-slip layer and the ground is greater than the suction force of an industrial carpet cleaning apparatus. Thus is prevented that the tile, particularly a light-weight tile, is sucked loose of the  
20 ground during cleaning operations. When the adhesive moreover exhibits flame-retarding or even flame-extinguishing properties, the fire safety of a floor covering formed by the tiles is increased. This is of particular importance when the tiles are used in high-rise buildings.  
25

          Finally, the invention further relates to a packaging which is filled with at least two carpet tiles as described above. Herein the anti-slip layer preferably covers the backing of the tile practically completely and  
30 the carpet tiles are releasably adhered to each other with the anti-slip layers on their backing.

          The invention is now elucidated on the basis of an embodiment, wherein reference is made to the annexed drawing, in which:

35           fig. 1 shows a schematic perspective view of a production line for performing the method according to the invention;

fig. 2 is a perspective view of the mutual adhering of the backings of a pair of carpet tiles; and

fig. 3 is a partly broken away perspective view of a packaging filled with carpet tiles.

5 In the method for forming carpet tiles 1 according to the present invention, light-weight material for the backing 2 wound onto a roll 6 (fig. 1) is first guided along a gluing station 14 where glue 8 runs in evenly spread manner from an outlet opening 11 of a  
10 container 10. The backing provided with a glue layer 8 is then guided to a pressing station 15. In pressing station 15 the backing 2 covered with glue 8 is combined with a top layer 12 coming from a roll 7. The top layer 12 and the backing 2 covered with glue are pressed onto one  
15 another by pressure rollers 9 of the pressing station 15 to form a carpet 13.

After optionally also being guided along a drying installation (not shown), the thus formed carpet 13 is transported to a coating station 16 where the  
20 backing 2 of carpet 13 is coated with an anti-slip layer. This coating station 16 comprises a container 17 filled with a material 18 which will form the anti-slip layer. A transfer roller 19 is arranged rotatably in the container 17 and placed such that it is partially immersed in the  
25 liquid material 18 and with its upper part just makes contact with carpet 13. By rotating roller 19 the anti-slip material 18 is applied over the full width of the backing 2 of carpet 13. The thus coated carpet is deflected by a guide roller 20 to a drying station 21 where  
30 a plurality of infrared radiators dry the anti-slip material 18 applied to the backing 2.

Via a guide roller 23 the carpet with the dried anti-slip layer comes to a first cutting station 24 where a number of parallel circular blades 26 arranged rota-  
35 tably at equal distances on a shaft 25 cut the carpet into strips. In a second cutting station 27 the carpet strips are cut to carpet tiles 1 by a vertically displaceable punching blade arranged in a frame 28. At a pack-

ing station 30 these carpet tiles 1 are then placed in pairs in a packaging 5 (fig. 3) with their anti-slip layers 3 mutually facing. Because the anti-slip layer 3 covers the whole backing of the tiles 1 it is not necessary here to place the tiles against each other in a specific manner, as was usual with the above discussed tiles according to the prior art.

The packaged tiles 1 eventually reach an end user who takes the tiles 1 out of the packaging 5 and can place them on a surface where due to the anti-slip layer 3 arranged thereon the tiles 1 form a robust carpet. Because the anti-slip layer 3 is arranged on the tiles and does not have to be applied to the ground prior to laying of the tiles 1, the tiles can be laid simply and quickly.

Used as anti-slip layer 3 in the embodiment shown is an adhesive which adheres more strongly to the material of the backing 2 of carpet tile 1 than to most other materials, such as for instance the material of the ground on which the tile 1 must be arranged or the material of the top layer 12 of the tile. Such an adhesive layer 3 adheres sufficiently to the ground to prevent shifting of the tile 1, but the adhesive power is not so strong that release of the tile 1 is made more difficult thereby. The adhesive is however chosen such that the adhesive power is greater than the suction force generated by modern high-power industrial carpet cleaning machines, so that the tile is not accidentally sucked up during cleaning of the floor covering. The adhesive layer moreover remains adhered to the backing 2 of tile 1 when it is taken up so that the ground does not thereafter have to be cleaned separately or provided with a new top layer. Taking up of the tiles, for instance when a rented area must be surrendered empty, is thus speeded up and finishing work minimized. Moreover, the adhesive together with the carpet tiles can thus be made suitable in simple manner for re-use, or burned. The environmental impact is



thus minimal. A suitable adhesive is for instance the above mentioned UZIN U 1000 L.

When the carpet tile according to the invention is intended for use in buildings where the fire safety is of particular importance, for instance in high-rise buildings, an adhesive can advantageously be applied which exhibits flame-retarding or even flame-extinguishing properties. The tile hereby fulfills a dual function, serving not only as floor covering but also as fire-resistant material.

Because the adhesive layer 3 adheres more strongly to the backing 2 than to any other type of material, including the top layer 12, the tiles 1 can for transport purposes be simply stacked on one another and placed in a packaging. However, in order to avoid any risk of adhering of the adhesive layer 3 to the top layer 12 of the tile, the tiles are preferably adhered in pairs to one another with their backing to form a unit 4 (fig. 2) and these tile units 4 are then packed (fig. 2 and 3). Any danger of damage to the tiles 1 by the adhesive layer 3 is thus prevented without it being necessary for this purpose to provide each tile 1 with a protective foil for removal before use or to arrange insert sheets and the like in the stacks of tiles. This enables a considerable saving in the amount of packaging material used, which results in cost reduction and less of an environmental impact. It is moreover only necessary for the tiles to be taken apart prior to use, whereby laying of tiles 1 also costs less time than is the case with the use of such protective packaging layers.

**CLAIMS**

1. Method for manufacturing carpet tiles by providing each carpet tile on its backing with an anti-slip layer which comprises an adhesive, **characterized in that** the backing of the carpet tile is covered  
5 practically completely with the anti-slip layer.

2. Method as claimed in claim 1, **characterized in that** after applying of the anti-slip layer the tiles are adhered releasably to each other and subsequently packed.

10 3. Method as claimed in claim 2, **characterized in that** the tiles are adhered in pairs to each other with their backing side.

4. Method as claimed in any of the foregoing claims, **characterized in that** the adhesive is dried prior  
15 to packaging of the tiles.

5. Method as claimed in any of the foregoing claims, **characterized in that** the tiles are cut from a roll of carpet and the anti-slip layer is applied to the roll before cutting thereof.

20 6. Carpet tile having on its backing an anti-slip layer which comprises an adhesive, evidently manufactured by the method as claimed in any of the foregoing claims.

7. Carpet tile as claimed in claim 6,  
25 **characterized in that** the adhesive is chosen such that the adhesive power between the anti-slip layer and the backing of the tile is greater than between the anti-slip layer and a surface for covering with the tile.

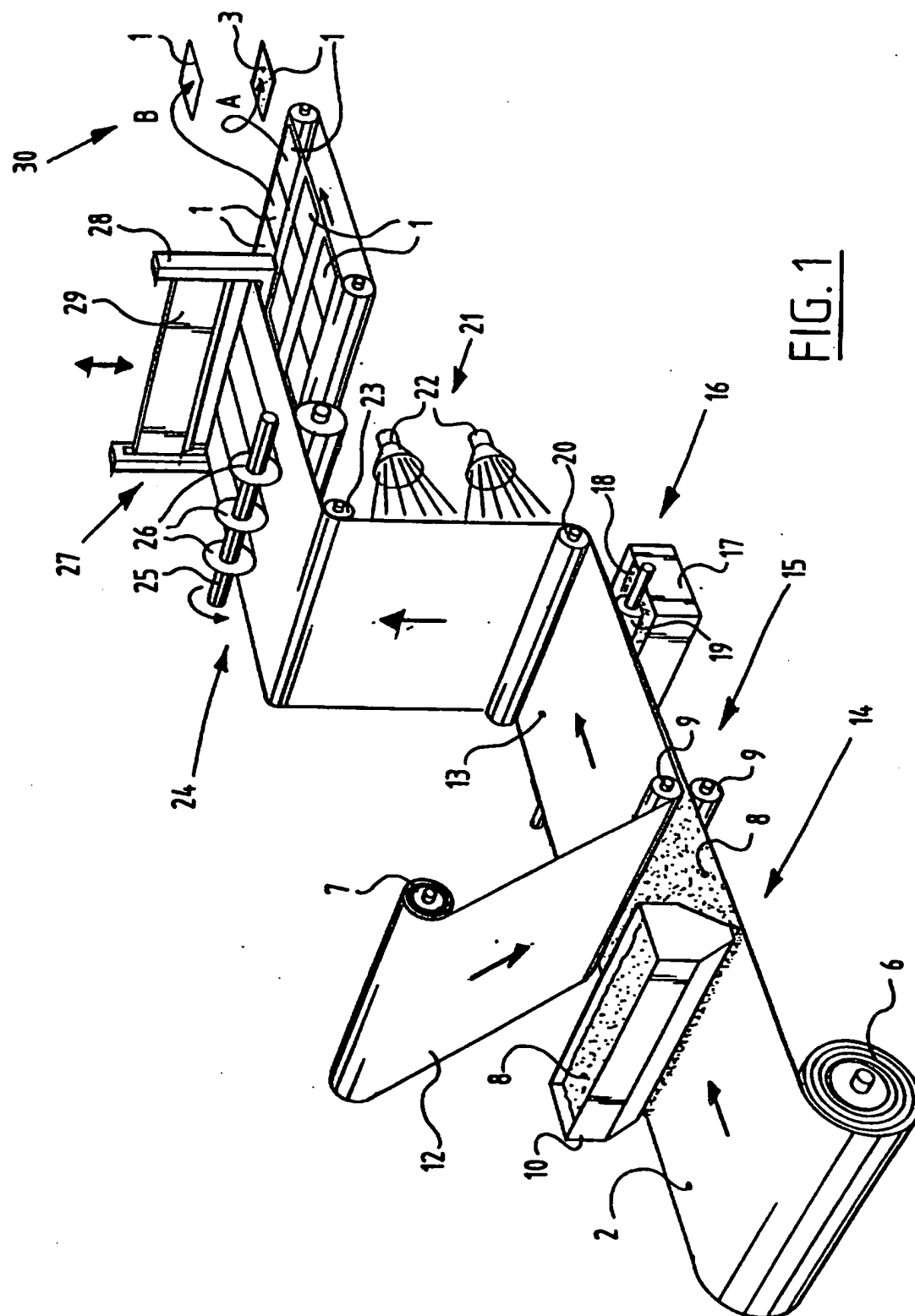
8. Carpet tile as claimed in claim 6 or 7,  
30 **characterized in that** the adhesive is chosen such that the adhesive power between the anti-slip layer and the surface is greater than the suction force of an industrial carpet cleaning apparatus.

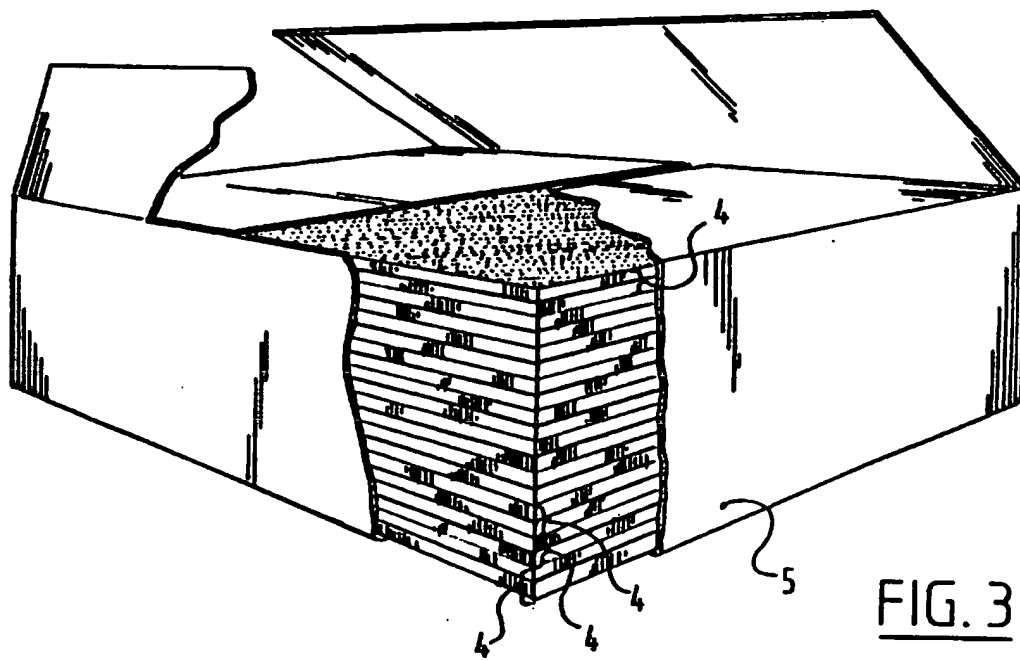
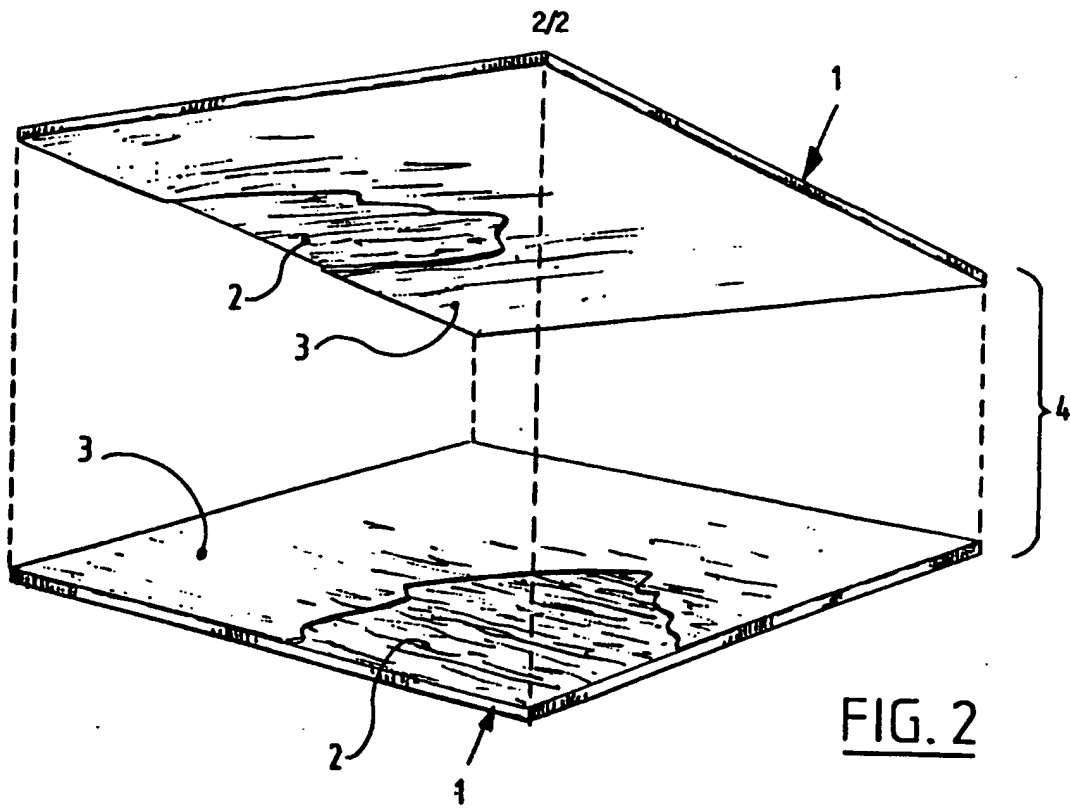
9. Carpet tile as claimed in any of the claims 6-8, **characterized in that** the adhesive exhibits flame-retarding or flame-extinguishing properties.

5 10. Packaging filled with at least two carpet tiles as claimed in any of the claims 6-9.

10 11. Packaging as claimed in claim 10, **characterized in that** the anti-slip layer covers the backing of the tile practically completely and the carpet tiles with the anti-slip layer are releasably adhered to each other on their backings.

1/2





## INTERNATIONAL SEARCH REPORT

International Application No

PCT/NL 95/00297

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 D06N7/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 D06N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO,A,83 04170 (KUNSTSTOFFVERWERTUNG AG) 8 December 1983 see page 1, line 1 - page 5, line 7 ---	1,2,7
A	EP,A,0 194 876 (BURLINGTON INDUSTRIES INC) 17 September 1986 see page 1, line 23 - page 8, line 2 ----	1-7,10, 11
A	GB,A,2 076 336 (NIPPON OIL CO LTD) 2 December 1981 see page 1, line 25 - page 3, line 40; claim 1 -----	1,6

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"A" document member of the same patent family

Date of the actual completion of the international search

8 December 1995

Date of mailing of the international search report

21.12.95

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax (+31-70) 340-3016

Authorized officer

V Beurden-Hopkins, S

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

PCT/NL 95/00297

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO-A-8304170	08-12-83	AU-B-	1554983	16-12-83
		EP-A-	0111500	27-06-84
		GB-A-	2134817	22-08-84
		NL-T-	8320155	02-04-84
		SE-A-	8400471	31-01-84
EP-A-0194876	17-09-86	US-A-	4617210	14-10-86
		CA-A-	1260437	26-09-89
		DE-A-	3680557	05-09-91
		JP-B-	6068205	31-08-94
		JP-A-	61273315	03-12-86
		US-A-	4680209	14-07-87
GB-A-2076336	02-12-81	JP-B-	1029700	13-06-89
		JP-C-	1546364	28-02-90
		JP-A-	56148544	18-11-81
		JP-B-	1009930	20-02-89
		JP-C-	1522425	12-10-89
		JP-A-	56157357	04-12-81
		AU-B-	541744	17-01-85
		AU-B-	6963381	29-10-81
		DE-A-	3115384	27-05-82
		NL-A-	8101855	16-11-81
		US-A-	4437918	20-03-84